

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE FORM PTO-1390 (Modified) (REV. 11-2000)		ATTORNEY'S DOCKET NUMBER 218072US6PCT	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 10/030121	
INTERNATIONAL APPLICATION NO PCT/GB00/02877	INTERNATIONAL FILING DATE 26 JULY 2000	PRIORITY DATE CLAIMED 29 JULY 1999	
TITLE OF INVENTION PIPE REPAIR DEVICE AND METHOD			
APPLICANT(S) FOR DO/EO/US Andrew SUTHERLAND, et al.			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c) (2)) <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)). 11. <input checked="" type="checkbox"/> A copy of the International Preliminary Examination Report (PCT/IPEA/409). 12. <input checked="" type="checkbox"/> A copy of the International Search Report (PCT/ISA/210). 			
Items 13 to 20 below concern document(s) or information included: <ol style="list-style-type: none"> 13. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 14. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 15. <input checked="" type="checkbox"/> A FIRST preliminary amendment. 16. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment 17. <input type="checkbox"/> A substitute specification. 18. <input type="checkbox"/> A change of power of attorney and/or address letter. 19. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. 20. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 21. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 22. <input type="checkbox"/> Certificate of Mailing by Express Mail 23. <input checked="" type="checkbox"/> Other items or information: 			
Notice of Priority / PCT/IB/304 / PCT/IB/308 PTO-1449			

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 10/030121	INTERNATIONAL APPLICATION NO. PCT/GB00/02877	ATTORNEY'S DOCKET NUMBER 218072US6PCT	
24. The following fees are submitted:		CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <ul style="list-style-type: none"> <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 			
ENTER APPROPRIATE BASIC FEE AMOUNT =		\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)).		<input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 \$130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	9 - 20 =	0	x \$18.00 \$0.00
Independent claims	2 - 3 =	0	x \$84.00 \$0.00
Multiple Dependent Claims (check if applicable)		<input type="checkbox"/>	\$0.00
TOTAL OF ABOVE CALCULATIONS =		\$1,020.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.		\$0.00	
SUBTOTAL =		\$1,020.00	
Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)).		<input type="checkbox"/> 20 <input type="checkbox"/> 30 + \$0.00	
TOTAL NATIONAL FEE =		\$1,020.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).		<input type="checkbox"/> \$0.00	
TOTAL FEES ENCLOSED =		\$1,020.00	
		Amount to be: refunded \$	
		charged \$	
a. <input checked="" type="checkbox"/> A check in the amount of \$1,020.00 to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0030 A duplicate copy of this sheet is enclosed. d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.			
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.			
SEND ALL CORRESPONDENCE TO:			
 22850 Surinder Sachar Registration No. 34,423			
 SIGNATURE Gregory J. Maier NAME 25,599 REGISTRATION NUMBER Jan 24 2002 DATE			
(703) 413-3000			

218072US-6-PCT

10/030121

531 Rec'd PCT/Pt 24 JAN 2002

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
ANDREW SUTHERLAND ET AL : ATTN: APPLICATION DIVISION
SERIAL NO: NEW U.S. PCT APPLICATION :
(Based on PCT/GB00/02877)
FILED: HEREWITH :
FOR: PIPE REPAIR DEVICE AND METHOD :

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified application as follows:

IN THE CLAIMS

Please cancel Claims 10 and 11 without prejudice.

Please amend the claims as follows:

3. (Amended) A device as claimed in claim 1 including means for completing the forming of the aperture in the pipe following fixation of the fluid entry device to the pipe.

5. (Amended) A device as claimed in claim 1 including means attachable to the elongate handle for forming a thread within the aperture in the pipe to allow the fluid entry device to be affixed to the pipe.

9. (Amended) A method as claimed in claim 6, including the step of forming a thread within the aperture in the pipe to allow the fluid entry device to be affixed to the pipe.--

IN THE ABSTRACT

Please add the following new Abstract on a separate sheet:

ABSTRACT

A device for repairing a pipe includes a number of kit items including an elongate insulated hollow handle with compressed air inlet and associated nipple. A trigger device controlled by a handle receives compressed air to power attachments connected to an adaptor. These attachments include a drill head that is powered by compressed air to drill into the pipe prior to using the device together with an injector head to inject sealant into the pipe from an above ground position.

REMARKS

Favorable consideration of this application, as presently amended, is respectfully requested.

The present Preliminary Amendment is submitted to place the above-identified application in more proper format under United States practice.

By the present Preliminary Amendment Claims 10 and 11 are cancelled, and the claims have been amended to no longer recite any improper multiple dependencies.

An Abstract is also submitted herein.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

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10/030121
531 Rec'd PCT/US 24 JAN 2002

Marked-Up Copy
Serial No:
Amendment Filed on:
<u>1-24-2002</u>

IN THE CLAIMS

Claims 10 and 11 (Cancelled).

Please amend the claims as follows:

--3. (Amended) A device as claimed in claim 1 [or 2] including means for completing the forming of the aperture in the pipe following fixation of the fluid entry device to the pipe.

5. (Amended) A device as claimed in [any preceding claim] claim 1 including means attachable to the elongate handle for forming a thread within the aperture in the pipe to allow the fluid entry device to be affixed to the pipe.

9. (Amended) A method as claimed in [any one of claims 6, 7 or 8] claim 6, including the step of forming a thread within the aperture in the pipe to allow the fluid entry device to be affixed to the pipe.--

IN THE ABSTRACT

Abstract (New).

PIPE REPAIR DEVICE AND METHOD

The invention relates to pipe repair and more particularly to repairing existing buried pipes.

In the past to gain access to a gas main, for example, a large hole has to be dug to allow the operative to get down into the hole and then to use various methods to gain access to an aperture in the pipe that needs repairing or sealing.

Such arrangements require a large hole to be dug with the necessary side wall support to allow the operative safe access to the pipe so as to carry out a repair.

The present invention is concerned with a device and method which allows the operative to work above ground without the need to excavate large holes.

According to the invention there is provided a pipe repair device including

- (a) an elongate insulated handle to allow operations to be carried out above ground,
- (b) means for forming an aperture in the pipe attachable to the handle,
- (c) means for fixing a fluid entry device to the pipe attachable to the handle, and

(d) means for injecting sealing fluid into the pipe via the entry device, said means for injecting sealing fluid being attachable to the handle.

Further according to the invention there is provided a method of repairing a fluid pipe including the steps of forming an aperture in the pipe from above ground by means of a device attached to an elongate insulated handle; fixing a fluid entry device to the pipe by means attached to the handle; and injecting sealing fluid into the pipe via the entry device by means attached to the handle.

The invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows an elongate handle with associated air trigger and air motorised devices attachable thereto;

Figure 2 shows a fluid sealing device attachable to the handle;

Figure 3 shows a drill with a gauge to allow only partial drilling through the pipe;

Figure 4 shows attachments for allowing tapping of the hole to provide a thread;

Figure 5 shows an attachment with a nipple for insertion into the tapped hole; and

Figure 6 shows completion of the drilling through the nipple into the pipe interior.

The arrangement of Figure 1 includes an elongate rod-like handle 10 (e.g. two metres in length) of insulated material (e.g. fibreglass) to prevent electric shock which could otherwise occur if the ground contained buried cables adjacent the pipe to be partially excavated. The handle is hollow and is sealed at one end by cap 11 and terminates at the other end by adapter 12 which include an air connection attachment 13. Towards the other end of the handle 10, an air inlet 14 with associated nipple 15 is provided. To this inlet 14, an air supply trigger 16 operable by handle 17 is attachable. The hollow handle 10 and the air trigger 16 are operable at pressures typically of 110 psi. A source of compressed air (not shown) is connected to trigger 16 at coupling 18 to act as a power source for items attached to adapter 12 and air connection 13. Devices such as the air-knife 20 with blade 21 and the

drill head 25 with drill bit 26 can be attached and powered (e.g. at 1800 rpm) under the control of trigger 16.

To excavate the hole which may be as small as 1 ft (0.3 metres) in diameter to access the main, the air-knife 20 is attached to the handle 10 via coupling 22. Any earth is removed and any water vacuumed out so that access to the main is then available.

To effect a repair to the pipe, a small hole is drilled into the pipe to gain access to the pipe interior using air drill 25 head and drill 26 attached via coupling 27 to the elongate handle 10.

To repair the main in the region of the aperture produced by drill 26, the Figure 2 arrangement is utilised which includes sealant injection head 30 with injector nozzle 31. The head is connected to the elongate housing 10 via coupling 32. The head 30 includes an integral pump which is powered by the air supply under the control of trigger 16 (see Figure 1). A source (not shown) of sealant (e.g. anaerobic fluid) is connected to flow tube 33 via coupling 34 so as to be injected into the main to effect sealing on hardening.

In practice, rather than the pipe being empty when being

repaired, the main pipe may be carrying natural gas or other fluid, i.e. under 'live' conditions. In these circumstances it is necessary to include additional items in the repair kit and to carry out additional method steps to prevent gas escape during the drilling and sealing operations.

To inject fluid under these circumstances it is necessary to carry out the drilling operation in a number of steps as shown in relation to Figures 3 to 6.

The drilling operation described above is carried out only partially in the initial step by employing the depth gauge arrangement of Figure 3. Here the drill 26 is passed through the body of gauge 40 and set via screw 41 to extend beyond the end of the gauge by a set amount, dependent on the thickness of the pipe, to ensure that drilling will only cause an aperture to be formed in part of the pipe wall thickness (e.g. 10mm). This prevents any gas escape to the outside as part of the pipe wall is still between the aperture and the gas.

After this step has been carried out a tapping operation is effected using the Figure 4 arrangement.

An adaptor in the form of a quick release coupling

includes body portion 50 and square end adaptor 51 for slotting into the handle end in place of the drill head.

A tapping head includes body 53 for locating in adaptor end 52 which includes cutting tap 54 for producing an internal thread within the partial aperture drilled in the pipe.

During the tapping operation, with the air trigger 16 of Figure 1 removed, the air inlet 14 extending from the handle 10 at 90° can be manually grasped to assist in applying a turning torque to the tap when threading the pipe.

When tapping has been achieved, the tap is withdrawn and removed from the handle 10.

The next step requires the fitting of a nipple to the tapped aperture and is achieved using the Figure 5 arrangement. The coupling 50 of Figure 4 can be used again to which, in this case, the carrier 60 is coupled.

The carrier includes a bore 61 through the body and holds the nipple 63 by means of screw 62. The handle 10 is again rotated to effect screwing in of the nipple.

The threaded portion 65 of the nipple cannot extend into the pipe beyond the tapped portion.

Thereafter with the nipple 63 and carrier 60 still in place, the coupling 50 is removed and the drill head 25 is again fitted to elongate handle 10, as is the air trigger 16. A fine drill 68 is attached and the drill is operated through the bore 61 and the head of nipple 63 to penetrate the last remaining portion of the wall of pipe 70 to communicate with the gas in the bore of the pipe. Withdrawal of the drill 68 will not cause flow of gas externally, as the nipple forms a barrier to any gas flow.

The sealant can then be pumped into the pipe via the nipple using the arrangement described in Figure 2 above. The handle 10 can then be removed and the injector head left in place for (say) twenty minutes until the sealant has cured. The head can then be removed. The nipple can remain in place, with a suitable cover or cap if desired.

The arrangement using the above described kit provides a quick and safe method of sealing. The insulated handle 10 assists in this aim, being capable of withstanding internal pressure of more than 150 psi and electrical voltage of more than 100 KV.

CLAIMS:

1. A pipe repair device including
 - (a) an elongate insulated handle to allow operations to be carried out above ground,
 - (b) means for forming an aperture in the pipe attachable to the handle,
 - (c) means for fixing a fluid entry device to the pipe attachable to the handle, and
 - (d) means for injecting sealing fluid into the pipe via the entry device, said means for injecting sealing fluid being attachable to the handle.
2. A device as claimed in claim 1 including means attachable to the elongate handle for excavating the ground to gain access to the pipe to be repaired.
3. A device as claimed in claim 1 or 2 including means for completing the forming of the aperture in the pipe following fixation of the fluid entry device to the pipe.
4. A device as claimed in claim 3 including means for completing the aperture formation through an aperture present in the fluid entry device.

5. A device as claimed in any preceding claim including means attachable to the elongate handle for forming a thread within the aperture in the pipe to allow the fluid entry device to be affixed to the pipe.

6. A method of repairing a fluid pipe including the steps of

forming an aperture in the pipe from above ground by means of a device attached to an elongate insulated handle;

fixing a fluid entry device to the pipe by means attached to the handle; and

injecting sealing fluid into the pipe via the entry device by means attached to the handle.

7. A method as claimed in claim 6 including the step of completing the forming of the aperture in the pipe following the fixation of the fluid centring device step.

8. A method as claimed in claim 7 including the step of completing the aperture formation through an aperture present in the fluid entry device.

9. A method as claimed in any one of claims 6, 7 or 8 including the step of forming a thread within the aperture in the pipe to allow the fluid entry device to be affixed to the pipe.

10. A pipe repair device substantially as described herein with reference to the accompanying drawings.

11. A method of repairing a fluid pipe as claimed in claim 6 and substantially as described herein.

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(21) International Application Number: **PCT/GB00/02877**

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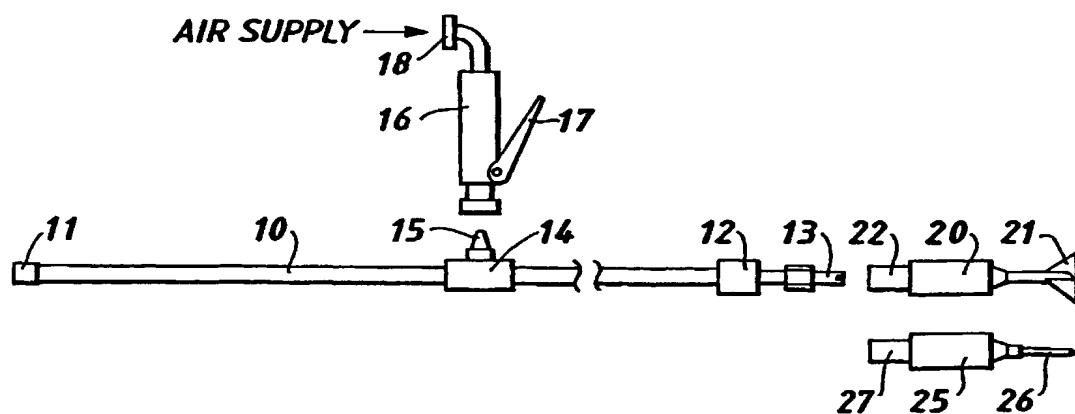
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(71) Applicant (for all designated States except US): **BG
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(72) Inventors; and

(75) Inventors/Applicants (for US only): **SUTHERLAND,**

(54) Title: PIPE REPAIR DEVICE AND METHOD



WO 01/09545 A1

(57) Abstract: A device for repairing a pipe includes a number of kit items including an elongate insulated hollow handle (10) with compressed air inlet (14) and associated nipple (15). A trigger device (16) controlled by handle (17) receives compressed air to power attachments connected to adaptor (12). These include a drill head (25) which is powered by compressed air to drill into the pipe prior to using the device together with an injector head to inject sealant into the pipe from an above ground position.

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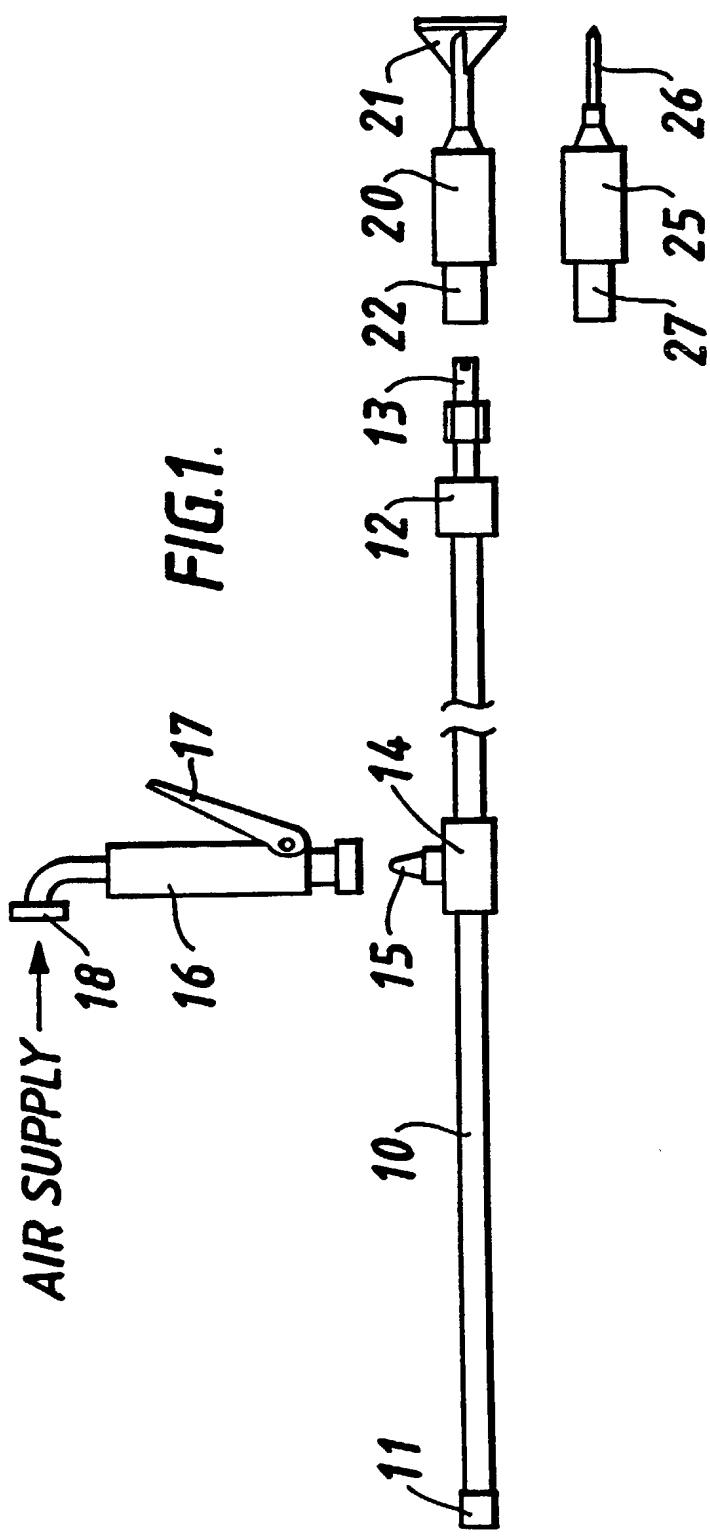
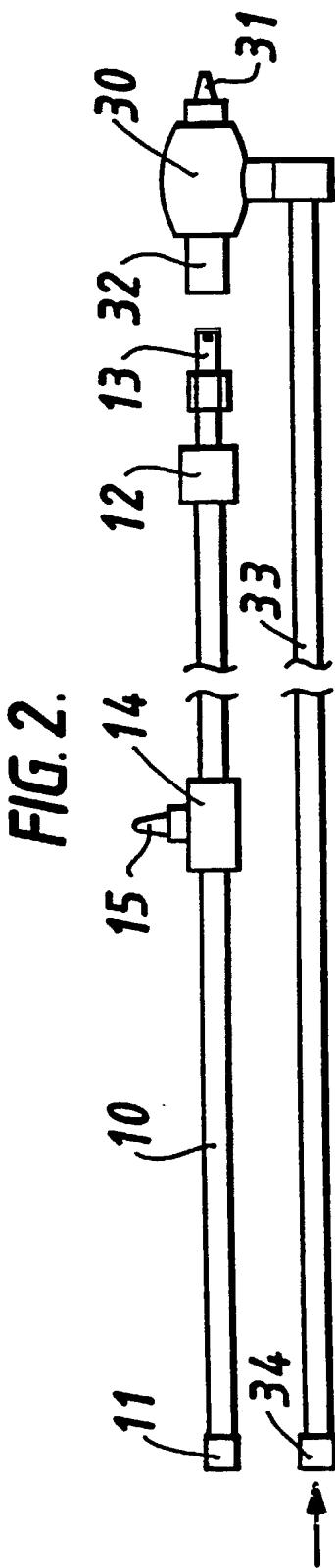


FIG. 1.



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FIG. 3.

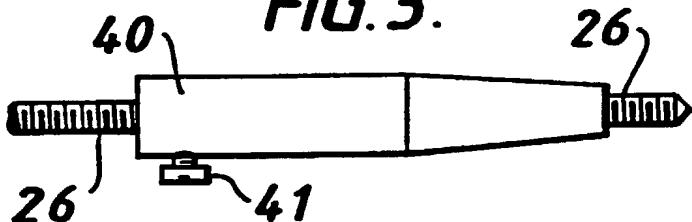


FIG. 4.

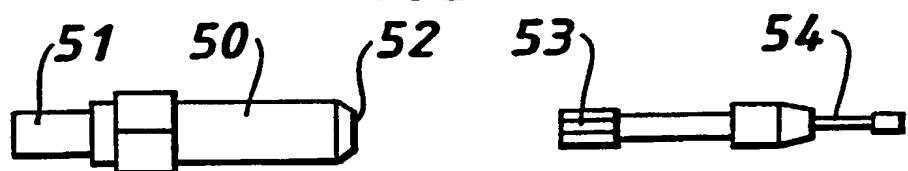


FIG. 5.

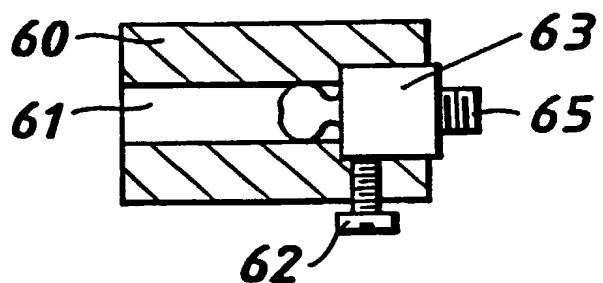
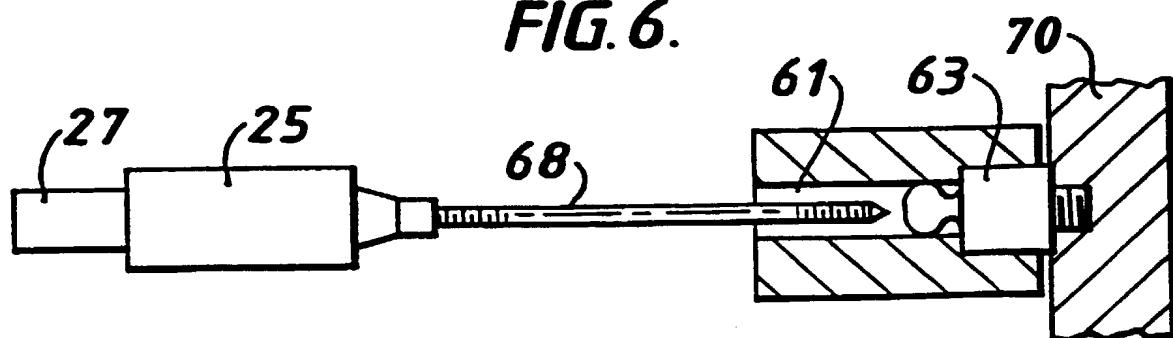


FIG. 6.



Declaration, Power of Attorney and Petition

Page 1 of 3

WE (I) the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PIPE REPAIR DEVICE AND METHOD

the specification of which

is attached hereto.

was filed on 24 JANUARY 2002 as

Application Serial No. 10/030,121

and amended on _____

was filed as PCT international application

Number PCT/GB00/02877

on 26 JULY 2000,

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

Application No.	Country	Day/Month/Year	Priority Claimed
<u>9917674.5</u>	<u>GREAT BRITAIN</u>	<u>29 JULY 1999</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No

We (I) hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application Number)	(Filing Date)	
(Application Number)	(Filing Date)	
We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or under § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.		
Application Serial No.	Filing Date	Status (pending, patented, abandoned)
PCT/GB00/02877	26 JULY 2000	

And we (I) hereby appoint the following registered practitioner(s):



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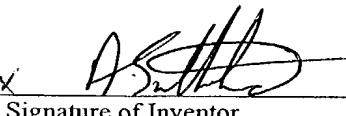
as our (my) attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith; and we (I) hereby request that all correspondence regarding this application be sent to



22850

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Andrew SUTHERLAND
NAME OF FIRST SOLE INVENTOR


Signature of Inventor

16/02/02
Date

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Citizen of: GREAT BRITAIN

Mailing Address: SAME AS ABOVE

Haydn PARSONAGE
NAME OF SECOND JOINT INVENTOR

Signature of Inventor

Peter CARSON
NAME OF THIRD JOINT INVENTOR

Signature of Inventor

Date

NAME OF FOURTH JOINT INVENTOR

Signature of Inventor

Date

NAME OF FIFTH JOINT INVENTOR

Signature of Inventor

Date

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Citizen of: **GREAT BRITAIN**

Mailing Address: SAME AS ABOVE

Residence:

Citizen of:

Mailing Address:

Residence:

Citizen of:

Mailing Address:

Haydn PARSONAGE
NAME OF SECOND JOINT INVENTOR

Signature of Inventor

Date

Peter CARSON
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Signature of Inventor

NAME OF FOURTH JOINT INVENTOR

Signature of Inventor

Date

NAME OF FIFTH JOINT INVENTOR

Signature of Inventor

Date _____

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